<u>CLAIMS</u>

1.   An apparatus for providing a virtual volume, the apparatus comprising:

a plurality of disks;

a back-end controller coupled to the disks for organizing and presenting the disks as a plurality of redundant arrays of disks; and

a front-end controller coupled to the back-end controller for striping the redundant arrays of disks and presenting the striped arrays as a virtual volume.

2.   The apparatus of claim 1 wherein the plurality of disks includes one or more spare disks.

3.   The apparatus of claim 1 wherein the back-end controller includes a plurality of busses, each coupled to one and only one of the disks associated with each of the redundant arrays of disks.

4.   The apparatus of claim 1 wherein the back-end controller comprises a RAID engine for presenting the disks as a plurality of RAID sets.

5.   The apparatus of claim 4 wherein the RAID engine comprises a RAID engine for presenting the disks as a plurality of RAID-5 sets.

6.   An apparatus for providing a virtual volume, the apparatus comprising:

a plurality of disks;

a RAID engine coupled to the disks for organizing and presenting the disks as a plurality of RAID sets; and

a striping engine coupled to the RAID engine for receiving the RAID sets as members, striping the member RAID sets, and presenting the striped RAID sets as a virtual volume.

7.   The apparatus of claim 6 wherein the RAID engine comprises a RAID-5 engine.

8.   An apparatus for providing a virtual volume, the apparatus comprising:

a plurality of back-end controllers, each configured to organize and present X N-member RAID sets, and each having N busses capable of supporting X+1 disks each;

a plurality of groups of X+1 disks, each group being coupled to one of the back-end controller busses; and

a local front-end controller coupled to the back-end controllers for receiving the RAID sets as members, striping the member RAID sets, and presenting the striped RAID sets as a virtual volume.

9.   The apparatus of claim 8 wherein the local front-end controller is configured to generate mirror sets from the RAID sets received as members from different back-end controllers, to stripe the mirror sets, and to present the striped mirror sets as the virtual volume.
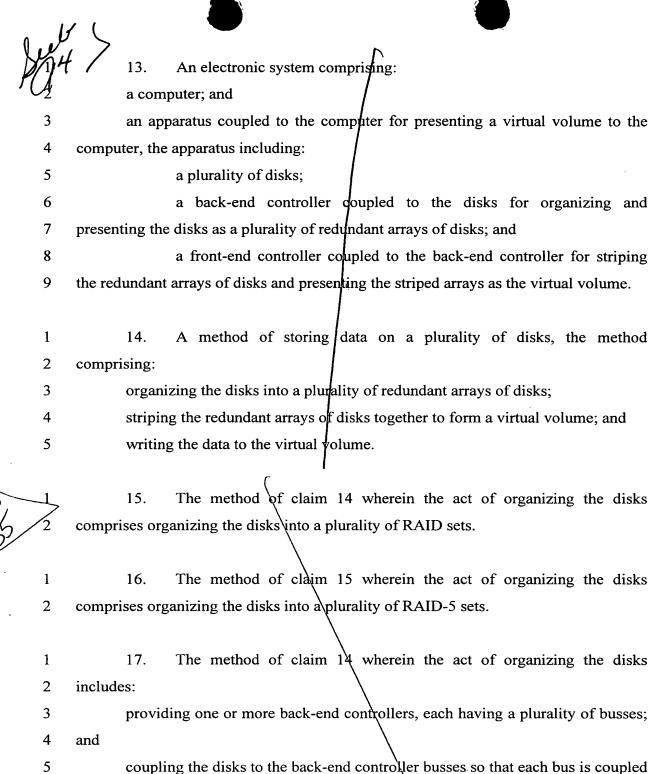
10.   The apparatus of claim 8 wherein the plurality of back-end controllers includes primary local, redundant local, cloning, primary remote, and redundant remote back-end controllers.

11.   The apparatus of claim 8 further comprising a remote front-end controller coupled to at least some of the back-end controllers for receiving RAID sets as members, striping the member RAID sets, and presenting the striped RAID sets as the virtual volume.

12.   The apparatus of claim 11 wherein the remote front-end controller is configured to generate mirror sets from the received RAID sets, to stripe the mirror sets, and to present the striped mirror sets as the virtual volume.

13.   An electronic system comprising:

a computer; and

an apparatus coupled to the computer for presenting a virtual volume to the computer, the apparatus including:

a plurality of disks;

a back-end controller coupled to the disks for organizing and presenting the disks as a plurality of redundant arrays of disks; and

a front-end controller coupled to the back-end controller for striping the redundant arrays of disks and presenting the striped arrays as the virtual volume.

14.   A method of storing data on a plurality of disks, the method comprising:

organizing the disks into a plurality of redundant arrays of disks;

striping the redundant arrays of disks together to form a virtual volume; and

writing the data to the virtual volume.

15.   The method of claim 14 wherein the act of organizing the disks comprises organizing the disks into a plurality of RAID sets.

16.   The method of claim 15 wherein the act of organizing the disks comprises organizing the disks into a plurality of RAID-5 sets.

17.   The method of claim 14 wherein the act of organizing the disks includes:

providing one or more back-end controllers, each having a plurality of busses; and

coupling the disks to the back-end controller busses so that each bus is coupled to no more than one disk from each redundant array of disks and each bus is coupled to a spare disk.

9

1   18.   A method of storing data on a plurality of disks, the method

2   comprising:

3   organizing the disks into a plurality of redundant arrays of disks;

4   forming mirror sets from the redundant arrays of disks;

5   striping the mirror sets together to form a virtual volume; and

6   writing the data to the virtual volume.

1   19.   The method of claim 18 wherein the act of organizing the disks

2   comprises organizing the disks into a plurality of RAID sets.

1   20.   The method of claim 19 wherein the act of organizing the disks

2   comprises organizing the disks into a plurality of RAID-5 sets.